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(54) Title: TRANSGENIC MONOCOTYLEDONOUS PLANTS OVEREXPRESSING A NHX PROTEIN AND HAVING IMPROVED GROWTH CHARACTERISTICS AND A METHOD FOR MAKING THE SAME

(57) Abstract: The present invention concerns a method for improving plant growth characteristics, comprising increasing, in a monocotyledonous plant, expression of a nucleic acid encoding an NFIX protein and/or increasing activity of an NFIX protein, wherein said plant is grown under non-salt stress conditions.



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and a method for making the same

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Ser	Pro	Gly	Thr	Ser	Ile	Ala	Ala	Ser	Ser	Val	Leu	Leu	Gly	Leu	Ile
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Leu	Leu	Gly	Arg	Ala	Ala	Phe	Val	Phe	Pro	Leu	Ser	Phe	Leu	Ser	Asn
		355					360					365			
Leu	Thr	Lys	Lys	Ser	Gln	His	Gln	Lys	Ile	Ser	Phe	Arg	Gln	Gln	Val
	370				375						380				
Ile	Ile	Trp	Trp	Ala	Gly	Leu	Met	Arg	Gly	Ala	Val	Ser	Met	Ala	Leu
385					390					395					400
Ala	Tyr	Asn	Gln	Phe	Thr	Met	Ser	Gly	His	Thr	Gln	Leu	Arg	Ser	Asn
				405					410					415	
Ala	Ile	Met	Ile	Thr	Ser	Thr	Ile	Thr	Val	Val	Leu	Phe	Ser	Thr	Val
			420					425					430		
Val	Phe	Gly	Leu	Leu	Thr	Lys	Pro	Leu	Ile	Arg	Leu	Leu	Leu	Pro	His
		435					440					445			
Pro	Lys	Ile	Thr	Ser	Ser	Met	Thr	Thr	Thr	Glu	Ser	Thr	Thr	Pro	Lys
	450					455					460				
Ser	Phe	Ile	Val	Pro	Leu	Leu	Gly	Asp	Ser	Arg	Asp	Ser	Glu	Ala	Asp
465					470					475					480
Leu	Glu	Gly	His	Glu	Ile	His	Arg	Pro	Asn	Ser	Leu	Arg	Ala	Leu	Leu
			485						490					495	
Ser	Thr	Pro	Thr	His	Thr	Val	His	Arg	Leu	Trp	Arg	Lys	Phe	Asp	Asp
			500					505					510		
Ser	Phe	Met	Arg	Pro	Val	Phe	Gly	Gly	Arg	Gly	Phe	Val	Pro	Val	Glu
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CD097PCT.ST25.txt

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 <212> DNA
 <213> Suaeda maritima subsp. salsa

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<210> 8
 <211> 556
 <212> PRT
 <213> Suaeda maritima subsp. salsa

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 20 25 30

CD097PCT.ST25.txt

Leu Leu Arg Gly Cys Ile Val Ile Gly His Leu Leu Glu Glu Asn Arg
 35 40 45

Trp Met Asn Glu Ser Ile Thr Ala Leu Leu Ile Gly Leu Ser Thr Gly
 50 55 60

Ile Ile Ile Leu Leu Ile Ser Gly Gly Lys Ser Ser His Leu Leu Val
 65 70 75 80

Phe Ser Glu Asp Leu Phe Phe Ile Tyr Leu Leu Pro Pro Ile Ile Phe
 85 90 95

Asn Ala Gly Phe Gln Val Lys Lys Lys Gln Phe Phe Arg Asn Phe Ile
 100 105 110

Thr Ile Ile Leu Phe Gly Ala Val Gly Thr Leu Val Ser Phe Ile Ile
 115 120 125

Ile Ser Leu Gly Ser Ile Ala Ile Phe Gln Lys Met Asp Ile Gly Ser
 130 135 140

Leu Glu Leu Gly Asp Leu Leu Ala Ile Gly Ala Ile Phe Ala Ala Thr
 145 150 155 160

Asp Ser Val Cys Thr Leu Gln Val Leu Asn Gln Asp Glu Thr Pro Leu
 165 170 175

Leu Tyr Ser Leu Val Phe Gly Glu Gly Val Val Asn Asp Ala Thr Ser
 180 185 190

Val Val Leu Phe Asn Ala Ile Gln Asn Phe Asp Leu Thr His Ile Asp
 195 200 205

His Arg Ile Ala Phe Gln Phe Gly Gly Asn Phe Leu Tyr Leu Phe Phe
 210 215 220

Ala Ser Thr Leu Leu Gly Ala Val Thr Gly Leu Leu Ser Ala Tyr Val
 225 230 235 240

Ile Lys Lys Leu Tyr Phe Gly Arg His Ser Thr Asp Arg Glu Val Ala
 245 250 255

Leu Met Met Leu Met Ala Tyr Leu Ser Tyr Met Leu Ala Glu Leu Phe
 260 265 270

Tyr Leu Ser Gly Ile Leu Thr Val Phe Phe Cys Gly Ile Val Met Ser
 275 280 285

His Tyr Thr Trp His Asn Val Thr Glu Ser Ser Arg Val Thr Thr Lys
 290 295 300

His Ala Phe Ala Thr Leu Ser Phe Val Ala Glu Ile Phe Ile Phe Leu
 305 310 315 320

Tyr Val Gly Met Asp Ala Leu Asp Ile Glu Lys Trp Arg Phe Val Ser
 325 330 335

Asp Ser Pro Gly Thr Ser Val Ala Val Ser Ser Ile Leu Leu Gly Leu

CD097PCT.ST25.txt

340 345 350

His Met Val Gly Arg Ala Ala Phe Val Phe Pro Phe Ala Phe Leu Met
355 360 365

Asn Leu Ser Lys Lys Ser Asn Ser Glu Lys Val Thr Phe Asn Gln Gln
370 375 380

Ile Val Ile Trp Trp Ala Gly Leu Met Lys Ser Ala Val Ser Val Ala
385 390 395 400

Leu Ala Tyr Asn Gln Phe Ser Arg Ser Gly His Thr Gln Leu Arg Gly
405 410 415

Asn Ala Ile Met Ile Thr Ser Thr Ile Thr Val Val Leu Phe Ser Thr
420 425 430

Met Val Phe Gly Leu Leu Thr Lys Pro Leu Ile Leu Phe Met Leu Pro
435 440 445

Gln Pro Lys His Phe Thr Ser Ala Ser Thr Val Ser Asp Leu Gly Ser
450 455 460

Pro Lys Ser Phe Ser Leu Pro Leu Leu Glu Asp Arg Gln Asp Ser Glu
465 470 475 480

Ala Asp Leu Gly Asn Asp Asp Glu Glu Ala Tyr Pro Arg Gly Thr Ile
485 490 495

Ala Arg Pro Thr Ser Leu Arg Met Leu Leu Asn Ala Pro Thr His Thr
500 505 510

Val His His Tyr Trp Arg Arg Phe Asp Asp Tyr Phe Met Arg Pro Val
515 520 525

Phe Gly Gly Arg Gly Phe Val Pro Phe Val Pro Gly Ser Pro Thr Glu
530 535 540

Gln Ser Ile Thr Asn Phe Val Thr Glu Asn Ile Ser
545 550 555

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<211> 1623
<212> DNA
<213> Zea mays

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CD097PCT.ST25.txt

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taa 1623

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<210> 10
<211> 540
<212> PRT
<213> Zea mays

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<400> 10

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Ser Thr Ser Asp His Ala Ser Val Val Ser Ile Asn Leu Phe Val Ala
20 25 30

Leu Leu Cys Ala Cys Ile Val Leu Gly His Leu Leu Glu Glu Asn Arg
35 40 45

Trp Val Asn Glu Ser Thr Ala Leu Ile Val Gly Leu Gly Thr Gly Thr
50 55 60

Val Ile Leu Met Ile Ser Arg Gly Val Val Ile His Val Leu Val Phe
65 70 75 80

Ser Glu Asp Leu Phe Phe Phe Tyr Leu Leu Pro Pro Ile Ile Phe Asn
85 90 95

Ala Gly Phe Gln Val Lys Lys Lys Gln Phe Phe Arg Asn Phe Ile Thr
100 105 110

Ile Thr Leu Phe Gly Ala Val Gly Thr Leu Ile Ser Phe Thr Val Ile
115 120 125

Ser Leu Gly Ala Leu Gly Leu Ile Ser Arg Leu Asn Ile Gly Ala Leu
130 135 140

Glu Leu Gly Asp Tyr Leu Ala Leu Gly Ala Ile Phe Ser Ala Thr Asp
145 150 155 160

Ser Val Cys Thr Leu Gln Val Leu Ser Gln Asp Glu Thr Pro Phe Leu
165 170 175

Tyr Ser Leu Val Phe Gly Glu Gly Val Val Asn Asp Ala Thr Ser Val

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CD097PCT.ST25.txt

180	185	190
Val Val Phe Asn Ala Leu Gln Asn Phe Asp Ile Thr His Ile Asp Ala	200	205
Glu Val Val Phe His Leu Leu Gly Asn Phe Phe Tyr Leu Phe Leu Leu	215	220
Ser Thr Val Leu Gly Val Ala Thr Gly Leu Ile Ser Ala Leu Val Ile	230	240
Lys Lys Leu Tyr Phe Gly Arg His Ser Thr Asp Arg Glu Val Ala Leu	245	255
Met Met Leu Met Ala Tyr Leu Ser Tyr Met Leu Ala Glu Leu Phe Ala	260	270
Leu Ser Gly Ile Leu Thr Val Phe Phe Gly Cys Ile Val Met Ser His	275	285
Tyr Thr Trp His Asn Val Thr Glu Ser Ser Arg Ile Thr Thr Lys His	290	300
Ala Phe Ala Thr Leu Ser Phe Leu Ala Glu Thr Phe Leu Phe Leu Tyr	310	320
Val Gly Met Asp Ala Leu Asp Ile Asp Lys Trp Arg Ser Val Ser Asp	325	335
Thr Pro Gly Lys Ser Leu Ala Ile Ser Ser Ile Leu Met Gly Leu Val	340	350
Met Val Gly Arg Ala Ala Phe Val Phe Pro Leu Ser Phe Leu Ser Asn	355	365
Leu Ala Lys Lys Thr Glu His Glu Lys Ile Ser Trp Lys Gln Gln Val	370	380
Val Ile Trp Trp Ala Gly Leu Met Arg Gly Ala Val Ser Met Ala Leu	385	400
Ala Tyr Lys Lys Phe Thr Arg Ala Gly His Thr Gln Val Arg Gly Asn	405	415
Ala Ile Met Ile Thr Ser Thr Ile Ile Val Val Leu Phe Ser Thr Met	420	430
Val Phe Gly Leu Leu Thr Lys Pro Leu Ile Asn Leu Leu Ile Pro His	435	445
Arg Asn Ala Thr Ser Met Leu Ser Asp Asp Ser Ser Pro Lys Ser Leu	450	460
His Ser Pro Leu Leu Thr Ser Gln Leu Gly Ser Asp Leu Glu Glu Pro	465	480
Thr Asn Ile Pro Arg Pro Ser Ser Ile Arg Gly Glu Phe Leu Thr Met	485	495

CD097PCT.ST25.txt

Thr Arg Thr Val His Arg Tyr Trp Arg Lys Phe Asp Asp Ala Phe Met
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Arg Pro Met Phe Gly Gly Arg Gly Phe Val Pro Phe Val Pro Gly Ser
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Pro Thr Glu Arg Asn Pro Pro Asp Leu Ser Lys Ala
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<211> 1623
<212> DNA
<213> Zea mays

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taa 1623

<210> 12
<211> 540
<212> PRT
<213> Zea mays

<400> 12
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Ser Thr Ser Asp His Ala Ser Val Val Ser Asn Asn Phe Phe Val Ala
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Leu Leu Cys Ala Cys Ile Val Leu Gly His Leu Leu Glu Glu Asn Arg

CD097PCT.ST25.txt

35	40	45
Met Val Asn Glu Ser Ile Thr Ala Leu Leu Val Gly Leu Gly Thr Gly		
50	55	60
Thr Val Ile Leu Met Ile Ser Arg Gly Val Ser Ile His Val Leu Val		
65	70	75
Phe Ser Glu Asp Leu Phe Phe Ile Tyr Leu Leu Pro Pro Ile Ile Phe		
85	90	95
Asn Ala Gly Phe Gln Val Lys Lys Lys Gln Phe Phe Arg Asn Phe Ile		
100	105	110
Thr Ile Ile Leu Phe Gly Ala Ile Gly Thr Leu Ile Ser Phe Val Ile		
115	120	125
Ile Ser Leu Gly Ala Met Gly Leu Phe Lys Lys Leu Asp Val Gly Pro		
130	135	140
Leu Glu Leu Gly Asp Tyr Leu Ala Ile Gly Ala Ile Phe Ser Ala Thr		
145	150	155
Asp Ser Val Cys Thr Leu Gln Val Leu Asn Gln Asp Glu Thr Pro Leu		
165	170	175
Leu Tyr Ser Leu Val Phe Gly Glu Gly Val Val Asn Asp Ala Thr Ser		
180	185	190
Ile Val Val Phe Asn Ala Leu Gln Asn Phe Asp Ile Thr His Ile Asn		
195	200	205
Ala Glu Val Val Phe His Leu Leu Gly Asn Phe Leu Tyr Leu Phe Leu		
210	215	220
Leu Ser Thr Val Leu Gly Val Ala Thr Gly Leu Ile Ser Ala Leu Val		
225	230	235
Ile Lys Lys Ile Tyr Phe Gly Arg His Ser Thr Asp Arg Glu Val Ala		
245	250	255
Leu Met Met Leu Met Ala Tyr Leu Ser Tyr Met Leu Ala Glu Leu Phe		
260	265	270
Ala Leu Ser Gly Ile Leu Thr Val Phe Phe Gly Cys Ile Val Met Ser		
275	280	285
His Tyr Thr Trp His Asn Val Thr Glu Ser Ser Arg Ile Thr Thr Lys		
290	295	300
His Ala Phe Ala Thr Leu Ser Phe Leu Ala Glu Thr Phe Ile Phe Leu		
305	310	315
Tyr Val Gly Met Asp Ala Leu Asp Ile Glu Lys Trp Arg Ser Val Ser		
325	330	335
Asp Thr Pro Gly Lys Ser Ile Ala Ile Ser Ser Ile Leu Met Gly Leu		
340	345	350

CD097PCT.ST25.txt

Val Met Leu Gly Arg Ala Ala Phe Val Phe Pro Leu Ser Phe Leu Ser
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Asn Leu Ala Lys Lys Asn Glu His Glu Lys Ile Ser Trp Lys Gln Gln
 370 375 380

Val Val Ile Trp Trp Ser Gly Leu Met Arg Gly Ala Val Ser Met Ala
 385 390 395 400

Leu Ala Tyr Asn Lys Phe Thr Arg Ala Gly His Thr Glu Val Arg Gly
 405 410 415

Asn Glu Ile Met Ile Thr Ser Thr Ile Thr Val Val Leu Phe Ser Thr
 420 425 430

Val Val Phe Gly Leu Leu Thr Lys Pro Leu Ile Arg Leu Leu Met Pro
 435 440 445

His Arg His Leu Thr Met Leu Ser Asp Asp Ser Thr Pro Lys Ser Leu
 450 455 460

His Ser Pro Leu Leu Thr Ser Gln Leu Gly Ser Ser Ile Glu Glu Pro
 465 470 475 480

Thr Gln Ile Pro Arg Pro Thr Asn Ile Arg Gly Glu Phe Thr Thr Met
 485 490 495

Thr Arg Thr Val His Arg Tyr Trp Arg Lys Phe Asp Asp Lys Phe Met
 500 505 510

Arg Pro Met Phe Gly Gly Arg Gly Phe Val Pro Phe Val Pro Gly Ser
 515 520 525

Pro Thr Glu Arg Asn Pro His Asp Leu Ser Lys Pro
 530 535 540

<210> 13
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 <212> DNA
 <213> Zea mays

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CD097PCT.ST25.txt

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<212> PRT
<213> Zea mays

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35 40 45
Asn Glu Ser Ile Thr Ala Ile Leu Val Gly Ala Ala Thr Gly Thr Val
50 55 60
Ile Leu Leu Ile Ser Lys Gly Lys Ser Ser His Ile Leu Val Phe Asp
65 70 75 80
Glu Glu Leu Phe Phe Ile Tyr Leu Leu Pro Pro Ile Ile Phe Asn Ala
85 90 95
Gly Phe Gln Val Lys Lys Lys Gln Phe Phe Arg Asn Phe Ile Thr Ile
100 105 110
Ile Leu Phe Gly Ala Ile Gly Thr Leu Ile Ser Phe Val Ile Ile Ser
115 120 125
Leu Gly Ala Met Gly Leu Phe Lys Lys Leu Asp Val Gly Pro Leu Glu
130 135 140
Leu Gly Asp Tyr Leu Ala Ile Gly Ala Ile Phe Ser Ala Thr Asp Ser
145 150 155 160
Val Cys Thr Leu Gln Val Leu Asn Gln Asp Glu Thr Pro Leu Leu Tyr
165 170 175
Ser Leu Val Phe Gly Glu Gly Val Val Asn Asp Ala Thr Ser Val Val
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Leu Phe Asn Ala Val Gln Lys Ile Asp Phe Glu His Leu Thr Gly Glu
195 200 205

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Val Ala Leu Gln Val Phe Gly Asn Phe Leu Tyr Leu Phe Ser Thr Ser
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 Thr Val Leu Gly Ile Ala Thr Gly Leu Ile Thr Ala Phe Val Leu Lys
 225 230 235 240
 Thr Leu Tyr Phe Gly Arg His Ser Thr Thr Arg Glu Leu Ala Ile Met
 245 250 255
 Val Leu Met Ala Tyr Leu Ser Phe Met Leu Ala Glu Leu Phe Ser Leu
 260 265 270
 Ser Gly Ile Ile Thr Val Phe Phe Cys Gly Val Leu Met Ser His Val
 275 280 285
 Thr Trp His Asn Val Thr Glu Ser Ser Arg Ile Thr Ser Arg His Val
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 Phe Ala Met Leu Ser Phe Ile Ala Glu Thr Phe Leu Phe Leu Tyr Val
 305 310 315 320
 Gly Thr Asp Ala Leu Asp Phe Thr Lys Trp Lys Thr Ser Ser Leu Ser
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 Phe Gly Lys Ser Leu Gly Val Ser Ser Val Leu Leu Gly Leu Val Leu
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 Val Gly Arg Ala Ala Phe Val Phe Pro Leu Ser Phe Leu Ser Asn Leu
 355 360 365
 Ser Lys Lys His Pro Gly Glu Lys Ile Thr Ile Arg Gln Gln Val Val
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 385 390 395 400
 Phe Asn Lys Phe Thr Arg Ala Gly His Thr Gln Val Arg Gly Asn Ala
 405 410 415
 Ile Met Ile Thr Ser Thr Ile Ile Val Val Leu Phe Ser Thr Val Val
 420 425 430
 Phe Gly Leu Leu Thr Lys Pro Leu Ile Asn Leu Leu Ile Pro His Arg
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 Asn Ala Thr Ser Met Leu Ser Asp Asp Ser Ser Pro Lys Ser Leu His
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 Ser Pro Leu Leu Thr Ser Gln Leu Ile Ser Ser Ile Glu Glu Pro Thr
 465 470 475 480
 Gln Ile Pro Arg Pro Thr Asn Ile Arg Gly Glu Phe Met Thr Met Thr
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 Arg Thr Val His Arg Tyr Trp Arg Lys Phe Asp Asp Lys Phe Met Arg
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530 535

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<211> 1617
<212> DNA
<213> Zea mays

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<400> 16

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CD097PCT.ST25.txt

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 Met Ile Thr Ser Thr Ile Thr Val Val Leu Phe Ser Thr Met Val Phe
 420 425 430
 Gly Met Ile Thr Lys Pro Leu Ile Arg Leu Leu Leu Pro Ala Ser Gly
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 His Pro Arg Glu Leu Ser Glu Pro Ser Ser Pro Lys Ser Phe His Ser
 450 455 460
 Pro Leu Leu Thr Ser Gln Gln Gly Ser Asp Leu Glu Ser Thr Thr Asn
 465 470 475 480
 Ile Val Arg Pro Ser Ser Leu Arg Gly Leu Leu Thr Lys Pro Thr His
 485 490 495
 Thr Val His Tyr Tyr Trp Arg Lys Phe Asp Asp Ala Leu Met Arg Pro
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CD097PCT.ST25.txt

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 <211> 538
 <212> PRT
 <213> Hordeum vulgare

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 35 40 45
 Arg Trp Leu Asn Glu Ser Ile Thr Ala Leu Ile Ile Gly Leu Cys Thr
 50 55 60
 Gly Val Val Ile Leu Met Thr Thr Lys Gly Lys Ser Ser His Val Leu
 65 70 75 80
 Val Phe Ser Glu Asp Leu Phe Phe Ile Tyr Leu Leu Pro Pro Ile Ile
 85 90 95
 Phe Asn Ala Gly Phe Gln Val Lys Lys Lys Gln Phe Phe Arg Asn Phe
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 Met Thr Ile Thr Leu Phe Gly Ala Val Gly Thr Met Ile Ser Phe Phe
 115 120 125
 Thr Ile Ser Leu Ala Ala Ile Ala Ile Phe Ser Lys Met Asn Ile Gly
 130 135 140
 Thr Leu Asp Val Ser Asp Phe Leu Ala Ile Gly Ala Ile Phe Ser Ala
 145 150 155 160

CD097PCT.ST25.txt

Thr Asp Ser Val Cys Thr Leu Gln Val Leu Asn Gln Asp Glu Thr Pro
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 Asp Ala Ile Val Ile Leu Lys Phe Leu Gly Asn Phe Cys Tyr Leu Phe
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 Val Ser Ser Thr Phe Leu Gly Val Phe Ser Gly Leu Leu Ser Ala Tyr
 225 230 235 240
 Ile Ile Lys Lys Leu Tyr Ile Gly Arg His Ser Thr Asp Arg Glu Val
 245 250 255
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 Leu Asp Leu Ser Gly Ile Leu Thr Val Phe Phe Cys Gly Ile Val Met
 275 280 285
 Ser His Tyr Thr Trp His Asn Val Thr Glu Ser Ser Arg Val Thr Thr
 290 295 300
 Lys His Ala Phe Ala Thr Leu Ser Phe Ile Ala Glu Thr Phe Leu Phe
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 Leu Tyr Val Gly Met Asp Ala Leu Asp Ile Glu Lys Trp Lys Phe Ala
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CD097PCT.ST25.txt

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Pro Thr His Thr Ile His Tyr Tyr Trp Arg Lys Phe Asp Asp Ala Leu
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<212> DNA

<213> Triticum aestivum

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CD097PCT.ST25.txt

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 <212> PRT
 <213> Triticum aestivum

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 35 40 45
 Arg Trp Leu Asn Glu Ser Ile Thr Ala Leu Ile Ile Gly Leu Cys Thr
 50 55 60
 Gly Val Val Ile Leu Met Thr Thr Lys Gly Lys Ser Ser His Val Leu
 65 70 75 80
 Val Phe Ser Glu Asp Leu Phe Phe Ile Tyr Leu Leu Pro Pro Ile Ile
 85 90 95
 Phe Asn Ala Gly Phe Gln Val Lys Lys Lys Gln Phe Phe Arg Asn Phe
 100 105 110
 Met Ala Ile Thr Leu Phe Gly Ala Val Gly Thr Met Met Ser Phe Phe
 115 120 125
 Thr Ile Ser Leu Ala Ala Ile Ala Ile Phe Ser Arg Met Asn Ile Gly
 130 135 140
 Thr Leu Asp Val Ser Asp Phe Leu Ala Ile Gly Ala Ile Phe Ser Ala
 145 150 155 160
 Thr Asp Ser Val Cys Thr Leu Gln Val Leu Asn Gln Asp Glu Thr Pro
 165 170 175
 Phe Leu Tyr Ser Leu Val Phe Gly Glu Gly Val Val Asn Asp Ala Thr
 180 185 190
 Ser Val Val Leu Phe Asn Ala Leu Gln Asn Phe Asp Pro Asn Gln Ile
 195 200 205
 Asp Ala Ile Val Ile Leu Lys Phe Leu Gly Asn Phe Cys Tyr Leu Phe
 210 215 220
 Val Ser Ser Thr Phe Leu Gly Val Phe Thr Gly Leu Leu Ser Ala Tyr
 225 230 235 240
 Val Ile Lys Lys Leu Tyr Ile Gly Arg His Ser Thr Asp Arg Glu Val
 245 250 255

CD097PCT.ST25.txt

Ala Leu Val Met Leu Met Ala Tyr Leu Ser Tyr Met Leu Ala Glu Leu
 260 265 270
 Leu Asp Leu Ser Gly Ile Leu Thr Val Phe Phe Cys Gly Ile Val Met
 275 280 285
 Ser His Tyr Thr Trp His Asn Val Thr Glu Ser Ser Arg Val Thr Thr
 290 295 300
 Lys His Ala Phe Ala Thr Leu Ser Phe Ile Ala Glu Thr Phe Leu Phe
 305 310 315 320
 Leu Tyr Val Gly Met Asp Ala Leu Asp Ile Glu Lys Trp Lys Phe Ala
 325 330 335
 Ser Asp Ser Pro Gly Lys Ser Ile Gly Ile Ser Ser Ile Leu Leu Gly
 340 345 350
 Leu Val Leu Val Gly Arg Ala Ala Phe Val Phe Pro Leu Ser Phe Leu
 355 360 365
 Ser Asn Leu Thr Lys Lys Thr Glu Leu Glu Lys Ile Ser Trp Arg Gln
 370 375 380
 Gln Ile Val Ile Trp Trp Ala Gly Leu Met Arg Gly Ala Val Ser Ile
 385 390 395 400
 Ala Leu Ala Tyr Asn Lys Phe Thr Arg Ser Gly His Thr Gln Leu His
 405 410 415
 Gly Asn Ala Ile Met Ile Thr Ser Thr Ile Thr Val Val Leu Phe Ser
 420 425 430
 Thr Met Leu Phe Gly Ile Leu Thr Lys Pro Leu Ile Arg Phe Leu Leu
 435 440 445
 Pro Ala Ser Ser Asn Gly Ala Ala Ser Asp Pro Ala Ser Pro Lys Ser
 450 455 460
 Leu His Ser Pro Leu Leu Thr Ser Gln Leu Gly Ser Asp Leu Glu Ala
 465 470 475 480
 Pro Leu Pro Ile Val Arg Pro Ser Ser Leu Arg Met Leu Ile Thr Lys
 485 490 495
 Pro Thr His Thr Ile His Tyr Tyr Trp Arg Lys Phe Asp Asp Ala Leu
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 Met Arg Pro Met Phe Gly Gly Arg Gly Phe Val Pro Tyr Ser Pro Gly
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 Ser Pro Thr Asp Pro Asn Val Leu Val Glu
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 <211> 1726
 <212> DNA

CD097PCT.ST25.txt

<213> Oryza sativa

<400> 21

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cttgatggtt gtccactcca gcttggggac tatcttgcaa ttggggctat cttctcagca      540
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<210> 22

<211> 544

<212> PRT

<213> Oryza sativa

<400> 22

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Met Gly Leu Asp Leu Gly Ala Leu Val Leu Lys Ser Gly Gly Leu Leu
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20          25          30

Leu Cys Ser Cys Ile Val Ile Gly His Leu Leu Glu Gly Asn Arg Trp
35          40          45

Val Asn Glu Ser Ile Thr Ala Leu Val Met Gly Leu Ile Thr Gly Gly
50          55          60

Val Ile Leu Leu Val Ser Gly Gly Lys Asn Ser His Ile Leu Val Phe
65          70          75          80

Ser Glu Asp Leu Phe Phe Ile Tyr Leu Leu Pro Pro Ile Ile Phe Asn
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Ala Gly Phe Gln Val Lys Lys Lys Gln Phe Phe Arg Asn Phe Met Thr

```

CD097PCT.ST25.txt

100	105	110
Ile Ile Leu Phe Gly Ala Val	Gly Thr Leu Ile Ser Phe Val Ile Ile	
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Ser Leu Gly Ala Met Thr Leu	Phe Lys Lys Leu Asp Val Gly Pro Leu	
130	135	140
Gln Leu Gly Asp Tyr Leu Ala Ile	Gly Ala Ile Phe Ser Ala Thr Asp	
145	150	155
Ser Val Cys Thr Leu Gln Val Leu	Asn Gln Asp Glu Thr Pro Leu Leu	
165	170	175
Tyr Ser Leu Val Phe Gly Glu Gly	Val Val Asn Asp Ala Thr Ser Val	
180	185	190
Val Leu Phe Asn Ala Ile Glu Asp	Ile Asp Ile Ala Asn Phe Asp Ser	
195	200	205
Leu Val Leu Leu Ala Phe Ile Gly	Asn Phe Leu Tyr Leu Phe Phe Thr	
210	215	220
Ser Thr Leu Leu Gly Val Val Ala	Gly Leu Leu Ser Ala Tyr Ile Ile	
225	230	235
Lys Lys Leu Cys Phe Ala Arg His	Ser Thr Asp Arg Glu Val Ala Ile	
245	250	255
Met Ile Leu Met Ala Tyr Leu Ser	Tyr Met Leu Ser Met Leu Leu Asp	
260	265	270
Leu Ser Gly Ile Leu Thr Val Phe	Phe Ser Gly Ile Val Met Ser His	
275	280	285
Tyr Thr Trp His Asn Val Thr Glu	Ser Ser Arg Ile Thr Thr Lys His	
290	295	300
Thr Phe Ala Thr Leu Ser Phe Ile	Ala Glu Ile Phe Leu Phe Leu Tyr	
305	310	315
Val Gly Met Asp Ala Leu Asp Ile	Glu Lys Trp Lys Leu Ala Ser Ser	
325	330	335
Ser Pro Lys Lys Pro Ile Ala Leu	Ser Ala Thr Ile Leu Gly Leu Val	
340	345	350
Met Val Gly Arg Ala Ala Phe Val	Phe Pro Leu Ser Phe Leu Ser Asn	
355	360	365
Leu Ser Lys Lys Glu Thr Arg Pro	Lys Ile Ser Phe Lys Gln Gln Val	
370	375	380
Ile Ile Trp Trp Ala Gly Leu Met	Arg Gly Ala Val Ser Ile Ala Leu	
385	390	395
Ala Tyr His Lys Phe Thr Ala Ser	Gly His Thr Glu Leu Arg Ile Asn	
405	410	415

CD097PCT.ST25.txt

Ala Ile Met Ile Thr Ser Thr Val Ile Val Val Leu Phe Ser Thr Met
 420 425 430

Val Phe Gly Phe Phe Thr Lys Pro Leu Leu Asn Leu Leu Ile Pro Pro
 435 440 445

Arg Pro Asp Ile Ala Ala Asp Leu Ser Ser Gln Ser Ile Ile Asp Pro
 450 455 460

Leu Leu Gly Ser Leu Leu Gly Ser Asp Phe Asp Val Gly Gln Pro Ser
 465 470 475 480

Pro Gln Asn Asn Leu Gln Leu Leu Leu Thr Ile Gln Thr Arg Ser Val
 485 490 495

His Arg Val Trp Arg Lys Phe Asp Asp Arg Phe Met Arg Pro Met Phe
 500 505 510

Gly Gly Arg Gly Phe Val Pro Phe Val Pro Gly Ser Pro Val Glu Arg
 515 520 525

Ser Ile His Gly Ser Gln Leu Gly Thr Val Thr Glu Ala Glu His Ser
 530 535 540

<210> 23
 <211> 1902
 <212> DNA
 <213> *Saccharomyces cerevisiae*

<400> 23

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CD097PCT.ST25.txt

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aatttgagag ataaactggg aacaatcttt aattccgact cacaatgggt tcaaaatttt 1800
gatgaacagg tattgaagcc agtattcttg gacaacgttt ctccatcctt acaagattcg 1860
gctacgcaat cacctgcaga tttctcttcc caaaaccact ag 1902

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<210> 24

<211> 633

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 24

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Thr Ala Lys Arg Ala Val Asp Pro Asp Asp Asp Asp Glu Leu Leu Pro
20 25 30

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Ser Pro Asp Leu Pro Gly Ser Asp Asp Pro Ile Ala Gly Asp Pro Asp
35 40 45

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```

Val Asp Leu Asn Pro Val Thr Glu Glu Met Phe Ser Ser Trp Ala Leu
50 55 60

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```

Phe Ile Met Leu Leu Leu Leu Ile Ser Ala Leu Trp Ser Ser Tyr Tyr
65 70 75 80

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```

Leu Thr Gln Lys Arg Ile Arg Ala Val His Glu Thr Val Leu Ser Ile
85 90 95

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Phe Tyr Gly Met Val Ile Gly Leu Ile Ile Arg Met Ser Pro Gly His
100 105 110

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Tyr Ile Gln Asp Thr Val Thr Phe Asn Ser Ser Tyr Phe Phe Asn Val
115 120 125

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Leu Leu Pro Pro Ile Ile Leu Asn Ser Gly Tyr Glu Leu Asn Gln Val
130 135 140

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```

Asn Phe Phe Asn Asn Met Leu Ser Ile Leu Ile Phe Ala Ile Pro Gly
145 150 155 160

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Thr Phe Ile Ser Ala Val Val Ile Gly Ile Ile Leu Tyr Ile Trp Thr
165 170 175

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Phe Leu Gly Leu Glu Ser Ile Asp Ile Ser Phe Ala Asp Ala Met Ser
180 185 190

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```

Val Gly Ala Thr Leu Ser Ala Thr Asp Pro Val Thr Ile Leu Ser Ile
195 200 205

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Phe Asn Ala Tyr Lys Val Asp Pro Lys Leu Tyr Thr Ile Ile Phe Gly
210 215 220

```

```

Glu Ser Leu Leu Asn Asp Ala Ile Ser Ile Val Met Phe Glu Thr Cys
225 230 235 240

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Gln Lys Phe His Gly Gln Pro Ala Thr Phe Ser Ser Val Phe Glu Gly

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CD097PCT.ST25.txt

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	260	265
Leu Ile Gly Ile Leu Val Ala Leu Leu Leu Lys His Thr His Ile Arg		
	275	280
Arg Tyr Pro Gln Ile Glu Ser Cys Leu Ile Leu Leu Ile Ala Tyr Glu		
	290	295
Ser Tyr Phe Phe Ser Asn Gly Cys His Met Ser Gly Ile Val Ser Leu		
	305	310
Leu Phe Cys Gly Ile Thr Leu Lys His Tyr Ala Tyr Tyr Asn Met Ser		
	325	330
Arg Arg Ser Gln Ile Thr Ile Lys Tyr Ile Phe Gln Leu Leu Ala Arg		
	340	345
Leu Ser Glu Asn Phe Ile Phe Ile Tyr Leu Gly Leu Glu Leu Phe Thr		
	355	360
Glu Val Glu Leu Val Tyr Lys Pro Leu Leu Ile Ile Val Ala Ala Ile		
	370	375
Ser Ile Cys Val Ala Arg Trp Cys Ala Val Phe Pro Leu Ser Gln Phe		
	385	390
Val Asn Trp Ile Tyr Arg Val Lys Thr Ile Arg Ser Met Ser Gly Ile		
	405	410
Thr Gly Glu Asn Ile Ser Val Pro Asp Glu Ile Pro Tyr Asn Tyr Gln		
	420	425
Met Met Thr Phe Trp Ala Gly Leu Arg Gly Ala Val Gly Val Ala Leu		
	435	440
Ala Leu Gly Ile Gln Gly Glu Tyr Lys Phe Thr Leu Leu Ala Thr Val		
	450	455
Leu Val Val Val Val Leu Thr Val Ile Ile Phe Gly Gly Thr Thr Ala		
	465	470
Gly Met Leu Glu Val Leu Asn Ile Lys Thr Gly Cys Ile Ser Glu Glu		
	485	490
Asp Thr Ser Asp Asp Glu Phe Asp Ile Glu Ala Pro Arg Ala Ile Asn		
	500	505
Leu Leu Asn Gly Ser Ser Ile Gln Thr Asp Leu Gly Pro Tyr Ser Asp		
	515	520
Asn Asn Ser Pro Asp Ile Ser Ile Asp Gln Phe Ala Val Ser Ser Asn		
	530	535
Lys Asn Leu Pro Asn Asn Ile Ser Thr Thr Gly Gly Asn Thr Phe Gly		
	545	550
		555
		560

CD097PCT.ST25.txt

Gly Leu Asn Glu Thr Glu Asn Thr Ser Pro Asn Pro Ala Arg Ser Ser
565 570 575

Met Asp Lys Arg Asn Leu Arg Asp Lys Leu Gly Thr Ile Phe Asn Ser
580 585 590

Asp Ser Gln Trp Phe Gln Asn Phe Asp Glu Gln Val Leu Lys Pro Val
595 600 605

Phe Leu Asp Asn Val Ser Pro Ser Leu Gln Asp Ser Ala Thr Gln Ser
610 615 620

Pro Ala Asp Phe Ser Ser Gln Asn His
625 630

<210> 25

<211> 1857

<212> DNA

<213> Magnaporthe grisea

<400> 25

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<210> 26

<211> 618

<212> PRT

<213> Magnaporthe grisea

CD097PCT.ST25.txt

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<400> 26
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20      25      30
Val Phe Ala Val Asp Gly Leu Gln Asp Leu Val Ser Phe Asp Tyr Gln
35      40      45
Ile Phe Phe Asn Leu Leu Leu Pro Pro Ile Ile Leu Ser Ser Gly Tyr
50      55      60
Glu Leu His Gln Ala Asn Phe Phe Arg His Ile Gly Thr Ile Leu Thr
65      70      75      80
Phe Ala Phe Ala Gly Thr Phe Leu Ser Ala Val Val Ile Gly Val Ile
85      90      95
Leu Trp Leu Tyr Thr Arg Val Pro Leu Glu Gly Leu Thr Met Asn Trp
100     105     110
Ile Asp Ala Ile Ser Val Gly Ala Thr Leu Ser Ala Thr Asp Pro Val
115     120     125
Thr Ile Ile Ala Ile Phe Asn Ser Tyr Lys Val Asp Pro Lys Leu Tyr
130     135     140
Thr Ile Ile Phe Gly Glu Ala Ile Leu Asn Asp Ala Val Ala Ile Val
145     150     155     160
Ile Phe Glu Ser Ala Gln Lys Ser Ala Arg Gly Leu Thr Lys Gly Ser
165     170     175
Ala Ala Gly Ile Ser Thr Phe Phe Trp Gly Phe Trp Ile Phe Leu Arg
180     185     190
Asp Phe Phe Gly Ser Leu Phe Ile Gly Ala Leu Leu Gly Ile Leu Thr
195     200     205
Ala Leu Met Leu Lys Tyr Thr Tyr Leu Arg Arg Phe Pro Lys Leu Glu
210     215     220
Ser Cys Leu Ile Val Leu Ile Ala Tyr Ala Thr Tyr Tyr Phe Ser Gln
225     230     235     240
Ala Ile His Met Ser Gly Ile Val Ser Leu Leu Phe Cys Gly Ile Thr
245     250     255
Leu Lys His Tyr Ala Tyr Phe Asn Met Ser Arg Arg Thr Gln Leu Thr
260     265     270
Thr Lys Tyr Met Phe Gln Val Leu Ala Gln Leu Ser Glu Asn Phe Ile
275     280     285
Phe Ile Tyr Leu Gly Val Ser Leu Phe Thr Asp Lys Asp Leu Gln Phe
290     295     300

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Gln Pro Leu Leu Ile Ile Val Thr Val Met Ala Val Cys Ala Ala Arg
 305 310 315 320
 Trp Val Ala Val Phe Pro Leu Ser Trp Ala Ile Asn Trp Phe His Lys
 325 330 335
 Tyr Arg Ala Glu Arg Arg Gly Ile Lys Asn Val Pro Glu Glu Leu Pro
 340 345 350
 Tyr Lys Tyr Gln Gly Met Leu Phe Trp Ala Gly Leu Arg Gly Ala Val
 355 360 365
 Gly Val Ala Leu Ala Ala Leu Leu Thr Ala Lys Asp His Arg Ala Phe
 370 375 380
 Lys Ala Thr Val Leu Val Val Val Val Leu Thr Val Ile Ile Phe Gly
 385 390 395 400
 Gly Thr Thr Val Asn Val Leu Glu Ile Leu Glu Ile Arg Thr Gly Val
 405 410 415
 Thr Asp Glu Ile Asp Ser Asp Asp Glu Phe Asp Ile Glu Ala Val Gly
 420 425 430
 Gly Tyr Tyr Lys Arg Ser Gly Asn Gly Ile Gly Tyr Ser Pro Ala Gly
 435 440 445
 Arg Asn Gly Val Val Pro Leu Asp Thr Arg Pro Gly Arg Arg Arg Asp
 450 455 460
 Ser Asn Gly Ala Val Gly Gly Arg Asp Ala Ser Gly Trp Ser Ser Gly
 465 470 475 480
 His Arg Ser Pro Leu Ser Ala Ala Arg Pro Gly Ser Leu Val Arg Thr
 485 490 495
 Gly Ser Thr Arg Glu Glu Ala Glu Arg Leu Asp Leu Leu Gly Asn Pro
 500 505 510
 Gly Gly Ser Thr Asp Ser Asp Asp Phe Gly Ser Asp Ile Asp Thr Ser
 515 520 525
 Asp Leu Pro Pro Pro Ala Pro Arg Arg Arg Ser Ser Pro Met Pro Pro
 530 535 540
 Thr Gly Asp Glu Glu Ala Ala Gly Leu Pro Ala Gly Gly Ser Arg Thr
 545 550 555 560
 Arg Ser Asn Thr Glu Thr Gly Gly Leu Ser Ala Thr Ala Ala Ile Arg
 565 570 575
 Gln Leu Phe Ser Thr Glu Asp Pro Thr Ala Leu Phe Arg Gln Leu Asp
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 Glu Asp Tyr Ile Lys Pro Lys Leu Leu Leu Asp Gly Gly Ala Gly Arg
 595 600 605

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Gly Asn Gly Gly Gly Ala Gly Gly Ser Ser
610 615

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<212> DNA
<213> *Oryza sativa*

<400> 27
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gcattacca aatatatata gcttacaaaa catgacaagc ttagtttgaa aaattgcaat 360
ccttatcaca ttgacacata aagtgagtga tgagtcataa tattattttc tttgctaccc 420
atcatgtata tatgatagcc acaaagttac tttgatgatg atatcaaaga acatttttag 480
gtgcacctaa cagaatatcc aaataatatg actcacttag atcataatag agcatcaagt 540
aaaactaaca ctctaaagca accgatggga aagcatctat aaatagacaa gcacaatgaa 600
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<210> 28
<211> 941
<212> DNA
<213> *Zea mays*

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<220>
<223> primer: prm3122

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<210> 30

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<211> 48

<212> DNA

<213> Artificial sequence

<220>

<223> primer: prm3123

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48